SEQUENCE LISTING

Met Glu Pro Ser Ala Leu Arg Lys Ala Gly Ser Glu Gln Glu Glu Gly
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Phe Glu Gly Leu Pro Arg Arg Val Thr Asp Leu Gly Met Val Ser Asn
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Leu Arg Arg Ser Asn Ser Ser Leu Phe Lys Ser Trp Arg Leu Gln Cys
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Pro Phe Gly Asn Asn Asp Lys Gln Glu Ser Leu Ser Ser Trp Ile Pro
    50   55   60

Glu Asn Ile Lys Lys Lys Glu Cys Val Tyr Phe Val Glu Ser Ser Lys
65   70   75   80

Leu Ser Asp Ala Gly Lys Val Val Cys Gln Cys Gly Tyr Thr His Glu
                85   90   95

Gln His Leu Glu Glu Ala Thr Lys Pro His Thr Phe Gln Gly Thr Gln
            100   105   110

Trp Asp Pro Lys Lys His Val Gln Glu Met Pro Thr Asp Ala Phe Gly
        115   120   125

Asp Ile Val Phe Thr Gly Leu Ser Gln Lys Val Lys Lys Tyr Val Arg
    130   135   140

Val Ser Gln Asp Thr Pro Ser Ser Val Ile Tyr His Leu Met Thr Gln
145   150   155   160

His Trp Gly Leu Asp Val Pro Asn Leu Leu Ile Ser Val Thr Gly Gly
                165   170   175

Ala Lys Asn Phe Asn Met Lys Pro Arg Leu Lys Ser Ile Phe Arg Arg
            180   185   190

Gly Leu Val Lys Val Ala Gln Thr Thr Gly Ala Trp Ile Ile Thr Gly
        195   200   205

Gly Ser His Thr Gly Val Met Lys Gln Val Gly Glu Ala Val Arg Asp
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Phe Ser Leu Ser Ser Ser Tyr Lys Glu Gly Glu Leu Ile Thr Ile Gly
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Val Ala Thr Trp Gly Thr Val His Arg Arg Glu Gly Leu Ile His Pro
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Thr Gly Ser Phe Pro Ala Glu Tyr Ile Leu Asp Glu Asp Gly Gln Gly
            260   265   270

Asn Leu Thr Cys Leu Asp Ser Asn His Ser His Phe Ile Leu Val Asp
            275   280   285

Asp Gly Thr His Gly Gln Tyr Gly Val Glu Ile Pro Leu Arg Thr Arg
    290   295   300

Leu Glu Lys Phe Ile Ser Glu Gln Thr Lys Glu Arg Gly Gly Val Ala
305   310   315   320

Ile Lys Ile Pro Ile Val Cys Val Val Leu Glu Gly Gly Pro Gly Thr
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Leu His Thr Ile Asp Asn Ala Thr Thr Asn Gly Thr Pro Cys Val Val

2

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                340                    345                    350


Val Glu Gly Ser Gly Arg Val Ala Asp Val Ile Ala Gln Val Ala Asn
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Leu Pro Val Ser Asp Ile Thr Ile Ser Leu Ile Gln Gln Lys Leu Ser
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Val Phe Phe Gln Glu Met Phe Glu Thr Phe Thr Glu Ser Arg Ile Val
385                    390                    395                    400


Glu Trp Thr Lys Lys Ile Gln Asp Ile Val Arg Arg Arg Gln Leu Leu
                405                    410                    415


Thr Val Phe Arg Glu Gly Lys Asp Gly Gln Gln Asp Val Asp Val Ala
            420                    425                    430


Ile Leu Gln Ala Leu Leu Lys Ala Ser Arg Ser Gln Asp His Phe Gly
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His Glu Asn Trp Asp His Gln Leu Lys Leu Ala Val Ala Trp Asn Arg
    450                    455                    460


Val Asp Ile Ala Arg Ser Glu Ile Phe Met Asp Glu Trp Gln Trp Lys
465                    470                    475                    480


Pro Ser Asp Leu His Pro Thr Met Thr Ala Ala Leu Ile Ser Asn Lys
                485                    490                    495


Pro Glu Phe Val Lys Leu Phe Leu Glu Asn Gly Val Gln Leu Lys Glu
            500                    505                    510


Phe Val Thr Trp Asp Thr Leu Leu Tyr Leu Tyr Glu Asn Leu Asp Pro
        515                    520                    525


Ser Cys Leu Phe His Ser Lys Leu Gln Lys Val Leu Val Glu Asp Pro
    530                    535                    540


Glu Arg Pro Ala Cys Ala Pro Ala Ala Pro Arg Leu Gln Met His His
545                    550                    555                    560


Val Ala Gln Val Leu Arg Glu Leu Leu Gly Asp Phe Thr Gln Pro Leu
                565                    570                    575


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Tyr Pro Arg Pro Arg His Asn Asp Arg Leu Arg Leu Leu Leu Pro Val
        580   585   590

Pro His Val Lys Leu Asn Val Gln Gly Val Ser Leu Arg Ser Leu Tyr
        595   600   605

Lys Arg Ser Ser Gly His Val Thr Phe Thr Met Asp Pro Ile Arg Asp
        610   615   620

Leu Leu Ile Trp Ala Ile Val Gln Asn Arg Arg Glu Leu Ala Gly Ile
625   630   635   640

Ile Trp Ala Gln Ser Gln Asp Cys Ile Ala Ala Ala Leu Ala Cys Ser
                645   650   655

Lys Ile Leu Lys Glu Leu Ser Lys Glu Glu Glu Asp Thr Asp Ser Ser
                660   665   670

Glu Glu Met Leu Ala Leu Ala Glu Glu Tyr Glu His Arg Ala Ile Gly
            675   680   685

Val Phe Thr Glu Cys Tyr Arg Lys Asp Glu Glu Arg Ala Gln Lys Leu
        690   695   700

Leu Thr Arg Val Ser Glu Ala Trp Gly Lys Thr Thr Cys Leu Gln Leu
705   710   715   720

Ala Leu Glu Ala Lys Asp Met Lys Phe Val Ser His Gly Gly Ile Gln
                725   730   735

Ala Phe Leu Thr Lys Val Trp Trp Gly Gln Leu Ser Val Asp Asn Gly
            740   745   750

Leu Trp Arg Val Thr Leu Cys Met Leu Ala Phe Pro Leu Leu Leu Thr
        755   760   765

Gly Leu Ile Ser Phe Arg Glu Lys Arg Leu Gln Asp Val Gly Thr Pro
        770   775   780

Ala Ala Arg Ala Arg Ala Phe Phe Thr Ala Pro Val Val Val Phe His
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4

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Leu Met Val Asp Phe Gln Pro Val Pro Ser Trp Cys Glu Cys Ala Ile
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Tyr Leu Trp Leu Phe Ser Leu Val Cys Glu Glu Met Arg Gln Leu Phe
        835                 840                 845

Tyr Asp Pro Asp Glu Cys Gly Leu Met Lys Lys Ala Ala Leu Tyr Phe
    850                 855                 860

Ser Asp Phe Trp Asn Lys Leu Asp Val Gly Ala Ile Leu Leu Phe Val
865                 870                 875                 880

Ala Gly Leu Thr Cys Arg Leu Ile Pro Ala Thr Leu Tyr Pro Gly Arg
                885                 890                 895

Val Ile Leu Ser Leu Asp Phe Ile Leu Phe Cys Leu Arg Leu Met His
            900                 905                 910

Ile Phe Thr Ile Ser Lys Thr Leu Gly Pro Lys Ile Ile Ile Val Lys
            915                 920                 925

Arg Met Met Lys Asp Val Phe Phe Phe Leu Phe Leu Leu Ala Val Trp
    930                 935                 940

Val Val Ser Phe Gly Val Ala Lys Gln Ala Ile Leu Ile His Asn Glu
945                 950                 955                 960

Arg Arg Val Asp Trp Leu Phe Arg Gly Ala Val Tyr His Ser Tyr Leu
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Thr Ile Phe Gly Gln Ile Pro Gly Tyr Ile Asp Gly Val Asn Phe Asn
            980                 985                 990

Pro Glu His Cys Ser Pro Asn Gly  Thr Asp Pro Tyr Lys  Pro Lys Cys
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Pro Glu  Ser Asp Ala Thr Gln  Gln Arg Pro Ala Phe  Pro Glu Trp
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Leu Leu  Leu Asn Leu Leu Ile  Ala Met Phe Asn Tyr  Thr Phe Gln
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Gln Val  Gln Glu His Thr Asp  Gln Ile Trp Lys Phe  Gln Arg His
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Asp Leu  Ile Glu Glu Tyr His  Gly Arg Pro Ala Ala  Pro Pro Pro
    1070             1075             1080


Phe Ile  Leu Leu Ser His Leu  Gln Leu Phe Ile Lys  Arg Val Val
    1085             1090             1095


Leu Lys  Thr Pro Ala Lys Arg  His Lys Gln Leu Lys  Asn Lys Leu
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Glu Lys  Asn Glu Glu Ala Ala  Leu Leu Ser Trp Glu  Ile Tyr Leu
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Lys Glu  Asn Tyr Leu Gln Asn  Arg Gln Phe Gln Gln  Lys Gln Arg
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Pro Glu  Gln Lys Ile Glu Asp  Ile Ser Asn Lys Val  Asp Ala Met
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Val Asp  Leu Leu Asp Leu Asp  Pro Leu Lys Arg Ser  Gly Ser Met
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Glu Gln  Arg Leu Ala Ser Leu  Glu Glu Gln Val Ala  Gln Thr Ala
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Arg Ala  Leu His Trp Ile Val  Arg Thr Leu Arg Ala  Ser Gly Phe
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Ser Ser  Glu Ala Asp Val Pro  Thr Leu Ala Ser Gln  Lys Ala Ala
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Glu Glu  Pro Asp Ala Glu Pro  Gly Gly Arg Lys Lys  Thr Glu Glu
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Pro Gly  Asp Ser Tyr His Val  Asn Ala Arg His Leu  Leu Tyr Pro
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Glu Arg  Lys Asp Ala Ala Ala  Met Asp Pro Met Gly  Asp Thr Leu
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Glu Pro  Leu Ser Thr Ile Gln  Tyr Asn Val Val Asp  Gly Leu Arg
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Asp Arg  Arg Ser Phe His Gly  Pro Tyr Thr Val Gln  Ala Gly Leu
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Pro Leu  Asn Pro Met Gly Arg  Thr Gly Leu Arg Gly  Arg Gly Ser
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Leu Ser  Cys Phe Gly Pro Asn  His Thr Leu Tyr Pro  Met Val Thr
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Arg Trp  Arg Arg Asn Glu Asp  Gly Ala Ile Cys Arg  Lys Ser Ile
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Lys Lys  Met Leu Glu Val Leu  Val Val Lys Leu Pro  Leu Ser Glu
    1370                 1375                 1380

His Trp  Ala Leu Pro Gly Gly  Ser Arg Glu Pro Gly  Glu Met Leu
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Pro Arg  Lys Leu Lys Arg Ile  Leu Arg Gln Glu His  Trp Pro Ser
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Phe Glu  Asn Leu Leu Lys Cys  Gly Met Glu Val Tyr  Lys Gly Tyr
    1415                 1420                 1425

Met Asp  Asp Pro Arg Asn Thr  Asp Asn Ala Trp Ile  Glu Thr Val
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Ala Val  Ser Val His Phe Gln  Asp Gln Asn Asp Val  Glu Leu Asn
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7

Arg Leu Asn Ser Asn Leu His Ala Cys Asp Ser Gly Ala Ser Ile
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13

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14

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Thr Gln Lys Ser Met Arg Lys Arg Ser Asn Arg Leu Gly Met Arg Ser
        35   40   45

Met Gly Lys Ser Ile Glu Cys His Ile Gln Tyr Ser Phe Asp Pro Val
        50   55   60

Thr Leu Arg Pro Leu Asn Pro Ile Gly Arg Thr Gly Leu Ser Gly Arg
65   70   75   80

Gly Leu Leu Gly Arg Trp Gly Pro Asn His Ala Ala Asp Pro Ile Val
                85   90   95

Ser Arg Thr Asn Asp Asn Gly Asp Leu Glu Phe Val Ala Val Gln Arg
            100   105   110

His Asp Asn Gly Glu Trp Ala Ile Pro Gly Gly Met Val Asp Ala Gly
            115   120   125

Glu His Val Ser Gln Thr Leu Arg Arg Glu Phe Ala Glu Glu Ala Met
    130   135   140

His Gly Ile Val Asp Ser Glu Asn Leu Asp Glu Leu Trp Asn Asn Gly
145   150   155   160

Lys Glu Leu Tyr Arg Gly Tyr Val Asp Asp Pro Arg Asn Thr Asp Asn
                165   170   175

Ala Trp Met Glu Thr Val Val Phe Asn Phe His Asp Ser Lys Gly Leu
            180   185   190

Leu Lys Asn Val Ala Leu Gln Ala Gly Asp Asp Ala Lys Ala Leu Arg
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Trp Ile Ala Val Asn Ser Asn Glu Pro Leu Tyr Ala Ser His Ser His
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Gln Ala Phe Arg Asn Ser Phe Ser Ser Ser Trp Phe His Leu Asn Thr
            35                  40                  45


Asn Val Met Ser Gly Ser Asn Gly Ser Lys Glu Asn Ser His Asn Lys
    50                  55                  60


Ala Arg Thr Ser Pro Tyr Pro Gly Ser Lys Val Glu Arg Ser Gln Val
65                  70                  75                  80


Pro Asn Glu Lys Val Gly Trp Leu Val Glu Trp Gln Asp Tyr Lys Pro
                85                  90                  95


Val Glu Tyr Thr Ala Val Ser Val Leu Ala Gly Pro Arg Trp Ala Asp
            100                 105                 110


Pro Gln Ile Ser Glu Ser Asn Phe Ser Pro Lys Phe Asn Glu Lys Asp
            115                 120                 125


Gly His Val Glu Arg Lys Ser Lys Asn Gly Leu Tyr Glu Ile Glu Asn
    130                 135                 140


Gly Arg Pro Arg Asn Pro Ala Gly Arg Thr Gly Leu Val Gly Arg Gly
145                 150                 155                 160


Leu Leu Gly Arg Trp Gly Pro Asn His Ala Ala Asp Pro Ile Ile Thr
                165                 170                 175


Arg Trp Lys Arg Asp Ser Ser Gly Asn Lys Ile Met His Pro Val Ser
                180                 185                 190


Gly Lys His Ile Leu Gln Phe Val Ala Ile Lys Arg Lys Asp Cys Gly
            195                 200                 205
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16

```
Glu Trp Ala Ile Pro Gly Gly Met Val Asp Pro Gly Glu Lys Ile Ser
    210             215             220

Ala Thr Leu Lys Arg Glu Phe Gly Glu Glu Ala Leu Asn Ser Leu Gln
225             230             235             240

Lys Thr Ser Ala Glu Lys Arg Glu Ile Glu Glu Lys Leu His Lys Leu
                245             250             255

Phe Ser Gln Asp His Leu Val Ile Tyr Lys Gly Tyr Val Asp Asp Pro
                260             265             270

Arg Asn Thr Asp Asn Ala Trp Met -Glu Thr Glu Ala Val Asn Tyr His
                275             280             285

Asp Glu Thr Gly Glu Ile Met Asp Asn Leu Met Leu Glu Ala Gly Asp
    290             295             300

Asp Ala Gly Lys Val Lys Trp Val Asp Ile Asn Asp Lys Leu Lys Leu
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Tyr Ala Ser His Ser Gln Phe Ile Lys Leu Val Ala Glu Lys Arg Asp
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Ala His Trp Ser Glu Asp Ser Glu Ala
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Met Gly Asp Tyr Lys Asp Asp Asp Asp Lys Arg Pro Leu Ala
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